Use of a Direct-Push Technique for Rapid Site Characterization

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Characterization studies in shallow ground-water-flow systems traditionally rely on the use of wells for water-quality and aquifer information. The use of monitoring wells specifically designed for these studies is preferable, as project funding and timing permit. However, with installation costs typically exceeding $5,000 per well, as dictated by their depth and construction materials, many studies rely on the use of operating or unused water-supply wells. With their long open or screened intervals, the usefulness of these wells can be limited for characterization of ground-water-flow systems.

Under the right geologic conditions, direct-push techniques, such as the use of Geoprobe® pneumatic technology, may be a cost-effective and technically sound alternative to the use of monitoring wells or water-supply wells in ground-water-flow characterization studies. This data-collection technology allows rapid installation of small-diameter (less than 2-inches) monitoring wells and collection of samples for characterization of vertical and horizontal trends in water and soil quality, soil-gas quality, and soil type. Geoprobe® units are more maneuverable, less damaging to terrain, faster, and generate substantially fewer cuttings than conventional drilling rigs.

Photograph showing the U.S. Geological Survey, Illinois District's Geoprobe Ò being used to collect a water-quality sample by a tributary to Moore's Run in Baltimore, MD. (Photo by Gary Fisher, USGS)

Geoprobe® use is limited to unconsolidated materials, such as sand, clay, or saprolite. Large diameter wells (greater than 2 inches) cannot be installed. Depths to 100 feet or more can be obtained under optimal conditions; however, the maximum operating depth typically is closer to 50 feet.

For additional information, the Geoprobe company can be contacted through their web site at: http://www.geoprobe.com. Companies with similar capabilities also exist in the private sector. In addition, for cooperative projects with the U.S. Geological Survey (USGS), several different Geoprobe systems are available. An example of a USGS study at the Dover Air Force Base, Delaware, is summarized in a report by Barbaro and Neupane (2002), which is available online at http://md.water.usgs.gov/publications/wrir-02-4121a/wrir-02-4121.pdf

Reference

Barbaro, J.R. and P.P. Neupane, 2002, Distribution and mass loss of volatile organic compounds in the surficial aquifer at sites FT03, LF13, and WP14/LF15, Dover Air Force Base, Delaware, November 2000 – February 2001: U.S. Geological Survey Water-Resources Investigations Report 02-4121, 63 p.